PARE PROJECT NO. 01055.00

892

COASTERS HARBOR EEL GRASS SURVEY
SUMMARY OF FINDINGS

GCMP-01-114-1298
NEWPORT, RHODE ISLAND

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DATA COLLECTION:

A total of 1,460 linear feet of subtidal area along the coastline was surveyed on July 26 and 27, 2001 between 7:00 am and 5:00 pm. Weather on the 26th was windy and rainy. Winds consistently from the north-northeast ranged in speed between 8 and 15 miles per hour (7 to 13 knots). Hard rain fell most of the day with above-water visibility reduced to significantly less than one mile. Strong north winds continued into the morning of the 27th. Weather in the afternoon was sunny and relatively calm with a light wind (sea breeze) from the south.

Baselines were established approximately at observed low water along the coast starting from the concrete outfall structure approximately in the middle of the project area and extending 700 feet east to the large pier and 760 feet west. A transect was established every 10 feet along the baseline. Visibility ranged between 8 and 12 feet – most of the time 10 feet or greater. The 10-foot spaced transects provided adequate visual coverage of the bottom to identify all eel grass beds (defined as dense coverage areas of eel grass at least ten feet in approximate diameter).

Each transect extended at least 150 feet offshore. Most of the transects in the middle of the survey area were approximately perpendicular to shore. Due to the curvature of the coastline and to avoid overlapping coverage or gaps in coverage, transects towards the western end of the survey area radiated around the coast. The orientation of each transect was established and maintained by one observer/note recorder on the coast playing out a 200-foot tape (to 150 feet). A diver swam along the transect lines following the direction of the observer and using visual references established offshore (small buoys or distinct land marks). During low visibility conditions (driving rain) a second observer was stationed in the water approximately at the middle of the transect (75 feet offshore) to provide a better visual reference. Buoys at the offshore ends of several transects were left in place and surveyed using a Trimble NT200D Differential Global Positioning System DGPS (+/- 15 feet accuracy).

The diver stopped at changes in bottom type or for specific species observation. The transect number, bottom type, any species observed, and distance offshore were noted by the shoreline stationed observer.

A laminated Braun-Blanquet Scale was used to visually estimate the density of eel grass. As a reference, any areas of eel grass with a scale score of 4 or higher (> 50% coverage) and larger than approximately 10 feet in diameter was recorded as an eel grass bed. In addition to the areas larger than 10 feet in diameter, locations of groups of individual shoots and dense patches smaller than 10 feet in diameter were also recorded. Individual shoots observed in a 50 x 50cm quadrat were counted.

Locations of oysters and scallops were recorded during the survey. Due to the density of the eel grass within the mapped bed, no oysters or scallops were observed. The number of individual oysters within a 50 x 50cm quadrat were counted and location recorded along transects as changes in abundance were observed. Numerous other species were also identified and their locations recorded. Changes in bottom type were also recorded.

Photographic Documentation: Video and still photographs were taken in several areas representative of the observed bottom conditions. Approximate locations of the video and photos were recorded. Photographs are included in Section 2 of this report.

DATA PROCESSING:

Recorded data consisting of transect number, distance offshore and observations were entered into AutoCAD™ (CAD) as discrete points. All data, including bottom type and species observed were entered into the drawing by measuring the distances offshore along each transect. Several GPS coordinates of the transect locations as well as landmarks, such as the concrete outfalls and the pier, that were readily identifiable on a 1997 Digital Orthophotograph Quad (DOQ), were used to position the baseline and offshore transects onto the baseplan (provided by TtNUS, Inc). Points locating the limits of the eel grass bed were connected to form a closed polygon. Other polygons were drawn around several areas of sparse eel grass. The polygon lines were then "splined" to make the boundary more consistent with actual conditions and more representative of the positional accuracy of the observations (+/- 15 feet).

A Triangular Irregular Network (TIN) of oyster count points was generated to produce generalized oyster density contours. Adequate data was collected and the contours illustrate the condition better than display of the point data. A regular 25 x 25 foot grid, interpolating areas between the recorded points, was created as part of the TIN production. The grid was produced to provide additional data to produce density contours that are representative of actual conditions and consistent with the positional accuracy of the survey. The contours produced illustrate the general distribution of oyster density across the survey area and are not intended to be precise analytical features. No field-testing ("ground truthing") of the grid, TIN, or contours was conducted.

All data collected and features mapped in CAD have been provided in the accompanying digital file (Section 4, pocket). The raw data points recorded or generated as part of the TIN process are not shown on the final paper plan accompanying this document (Section 3; pocket).

RESULTS:

The plan shows a large eel grass bed along the north west side of Coasters Island. The offshore limit of the eastern end of the eel grass bed was outside of the study area. The bed also extended further west beyond the last transect. Large boulders were observed in several areas within the eel grass bed. The largest boulder areas are shown on the plan as "holes" in the bed.

It is important to note that the identified as an eel grass bed had scale score of 4 to 5 (between 70 and 100% coverage). Observed eel grass coverage was either very dense (>70%; Photo 1) or very sparse (individual shoots; Photo 2). Several areas consisted of dense patches of eel grass that were much smaller than 10 feet in diameter (typically between 1 and 2 feet). These areas are shown within the hatched area on the plan.

Oysters were found to be abundant on the east side of the survey area (Photo3). Only 2 scallops were observed in the study area just to the east of the eel grass bed. It is expected that scallops were present within the eel grass bed. The density of the eel grass precluded close investigation of species within the beds. Other species observed are listed in Table 1. The list is not an all-inclusive list of species within the survey area, but rather a representation of the conditions observed. Green Crabs were observed throughout the site, as were schools of Atlantic Silversides. The overall diversity of animal and plant species appeared to increase towards the west. In addition to the eel grass bed, the species observed in the western section included oysters, quahogs, scallops, mussels in shallow water, and numerous types of vegetation and algae. The eastern section was almost entirely dominated by the presence of oysters.

In addition to the areas of dense eel grass coverage; rock, pebble/cobble, sand, shell, and mud bottoms were observed. Near shore areas tended to be composed of pebble/cobble bottoms (Photo 4). Mid-transect, the bottom was typically covered in a combination of pebbles, cobbles and shells with some sandy areas (Photo 5). The offshore ends of the transects, particularly toward the east were typically composed of mud (Photo 6). Offshore depths ranged from approximately 3 feet NGVD at the eastern end of the area, 5 feet NGVD in the middle of the site and were deepest, approximately 15 feet NGVD, near the western end of the area. Predicted and measured tides at the Newport tide gauge are shown in Figure 1.

TABLE 1. OBSERVED SPECIES

CRABS	
Blue Crab	*Callinectes sapidus*
Common Spider Crab	*Libinia emarginata*
Green Crab	*Carcinus maenas*
FISHES	
Atlantic Silversides	*Menidia menidia*
Summer Flounder	*Paralichthy dentatus*
Tautog	*Tautoga onitis*
Winter Skate	*Raja ocellatus*
MANTIS SHRIMPS	
Mantis Shrimp*	*Squilla empusa*
PLANTS	
Green Fleece	*Codium fragile*
Sea Lettuce	*Ulva lactuca*
Eel Grass	*Zostera marina*
Spiral Rockweed	*Fucus spiralis*
Other unidentified algae	
SEA STARS	
Forbes Sea Star	*Asterias forbesi*
SHELLFISH	
Bay Scallop	*Aequipecten irradians*
Blue Mussels	*Mytilus edulis*
Common Oyster	*Crassotrea virginica*
Quahog	*Mercenaria mercenaria*

*burrows identified

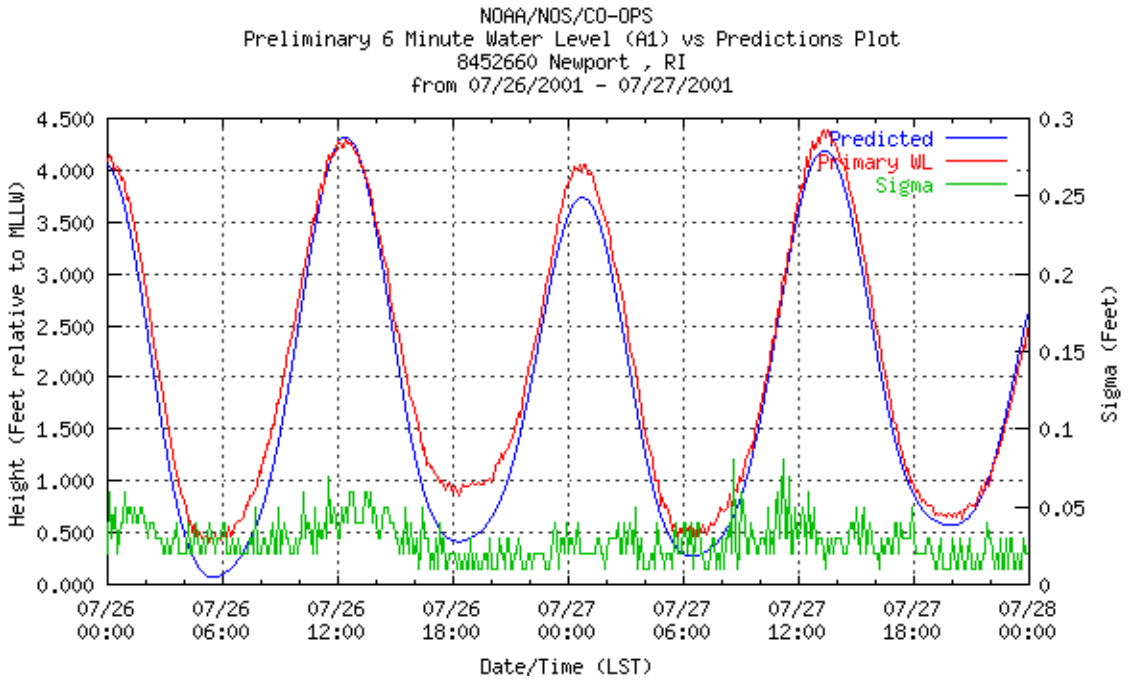

Figure 1. Tide Chart. Plot of observed and predicted water level observations. From the NOAA Center for Operational Oceanographic Products and Services (CO-OPS) website (http://www.co-ops.nos.noaa.gov/data_res.html).

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Phillips, R.C. and McRoy, C.P., eds, 1990, *Seagrass Research Methods*, Unesco, Paris, France, 210 pp.

Thayer, G.W. and Fonseca, M.S., 1984, *The Ecology of Eelgrass Meadows of the Atlantic Coast: A Community Profile*, US Fish and Wildlife Service, FWS/OBS-84/02, 147pp.

Photo 1. Dense eel grass coverage within the mapped bed.

Photo 2. Individual eel grass shoots surrounded by algae on a predominately mud bottom.

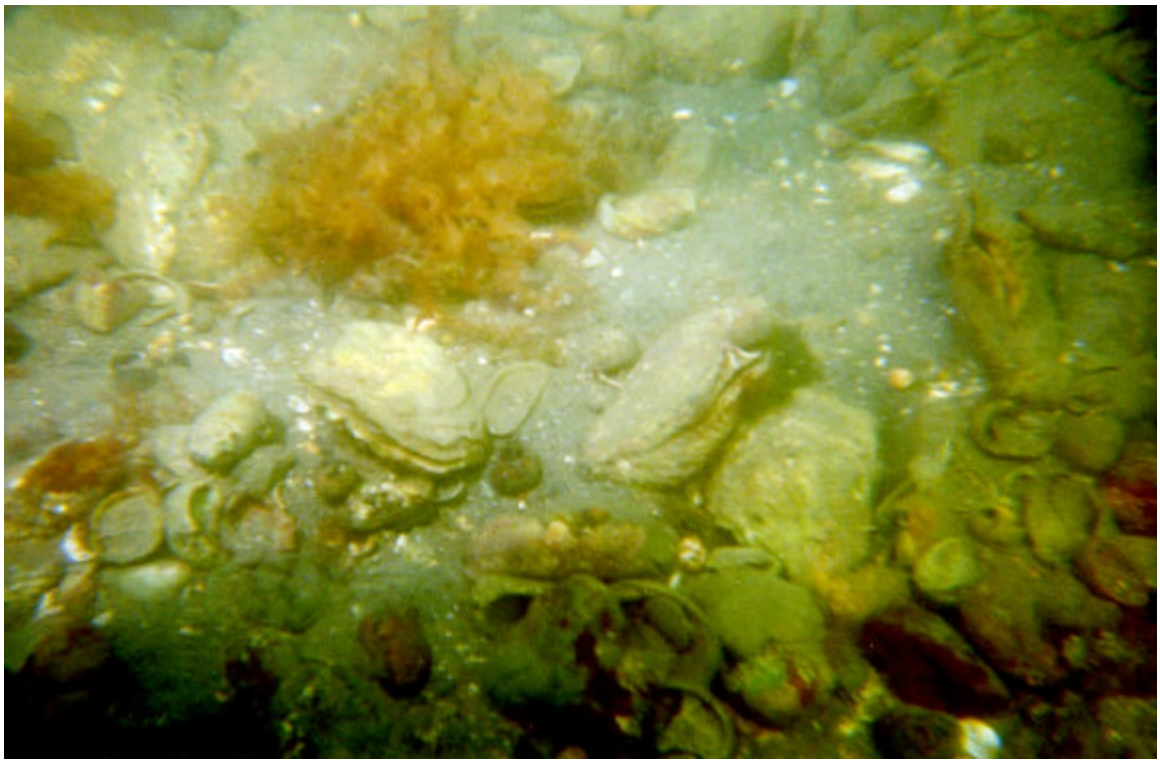

Photo 3. Oysters and shells on mud bottom.

Photo 4. Pebble/cobble bottom typical of near shore areas.

Photo 5. Typical mid-transect bottom characteristics – pebbles, cobbles, shells and oysters. Note two Blue Crabs observed at this location.

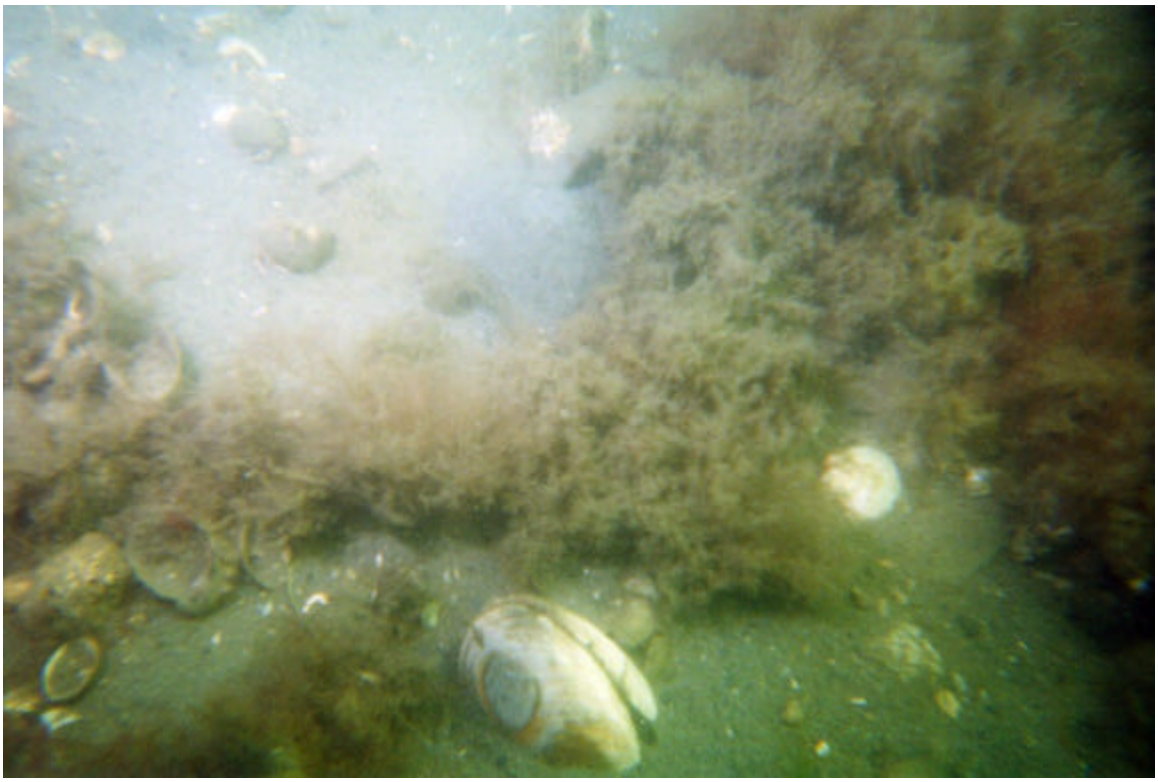

Photo 6. Offshore areas composed primarily of mud. Note the presence of Quahogs that were limited to the offshore areas between the central concrete outfall and the eel grass bed.

Photo 7. Predominantly shell bottom.

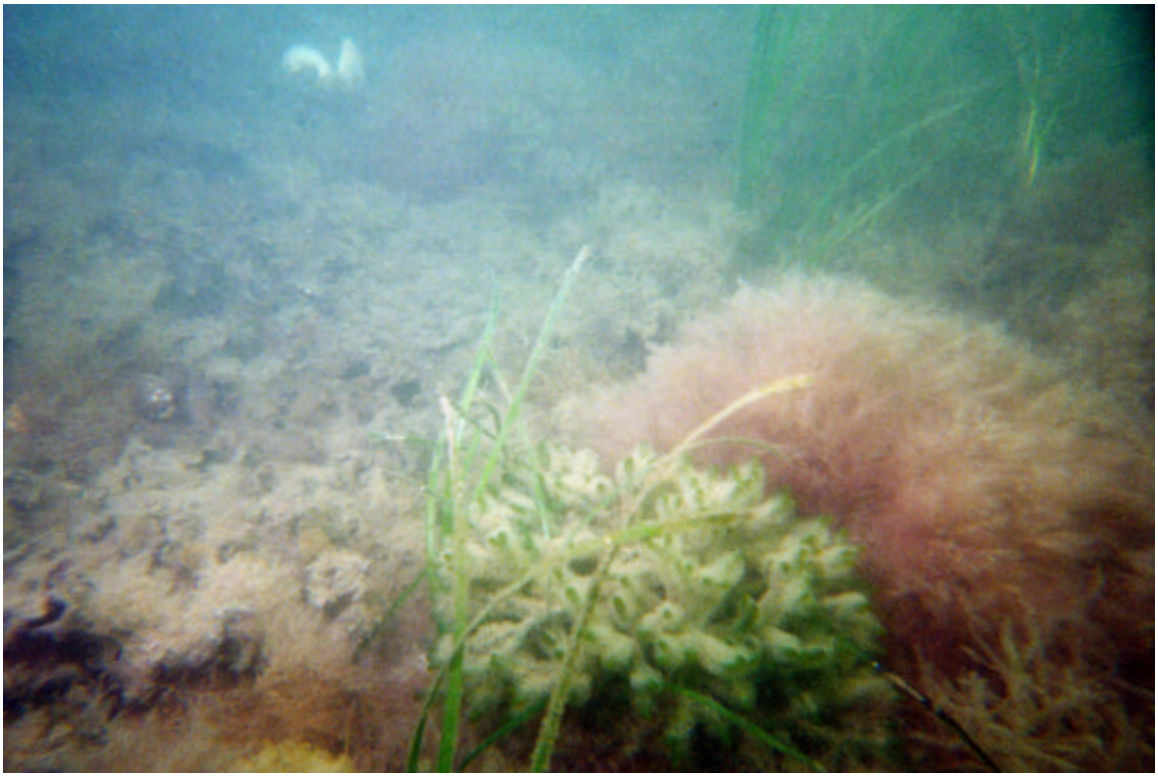

Photo 8. Sparse eel grass surrounded by a diverse assemblage of algae

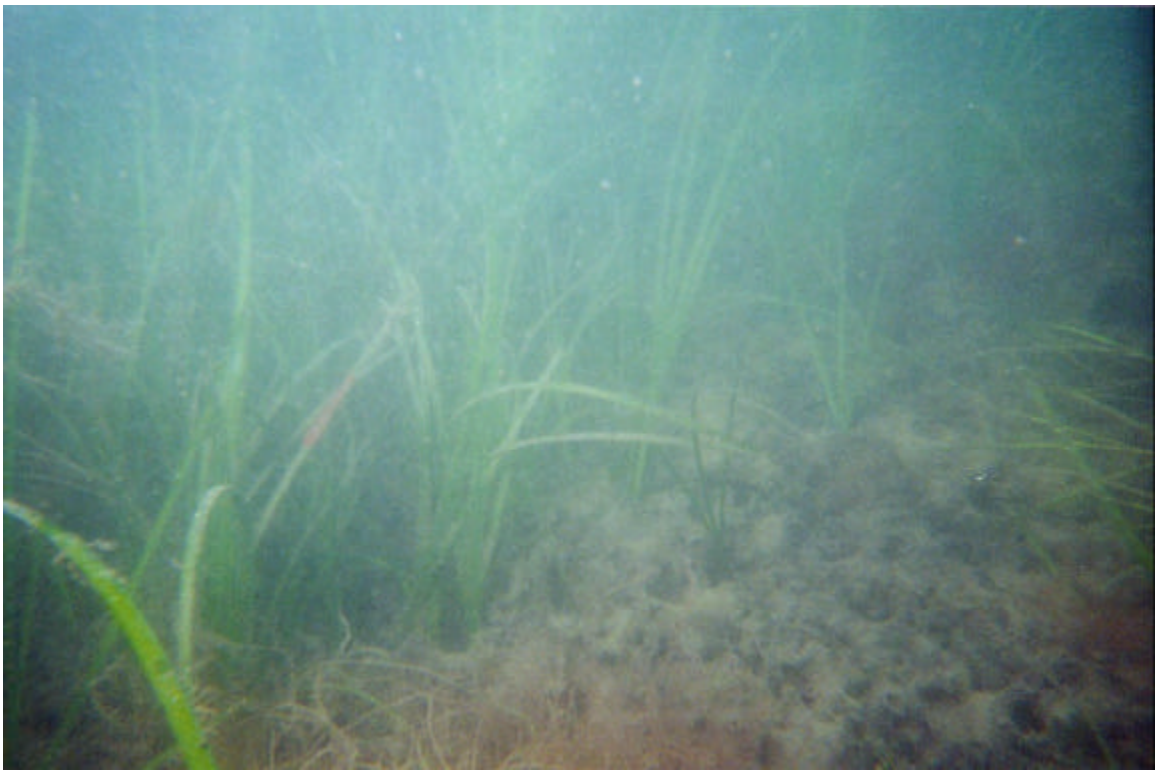

Photo 9. Edge of eel grass bed.

Photo 10. View of dense eel grass growth within the mapped bed.